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175 Canal Street, 4th  
Manchester, NH 03101-2335

EXAMINER
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RUTLAND WALLIS, MICHAEL

ART UNIT	PAPER NUMBER
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2836

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**MAILED**  
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**GROUP 2800**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/634,434  
Filing Date: August 05, 2003  
Appellant(s): COPE ET AL.

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Todd A. Sullivan  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 01/22/2007 appealing from the Office action mailed 08/23/2006.

**(1) Real Party in Interest**

A Statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct, however Applicant states "A Response to the Final Office Action of April 13, 2006 was filed on July 13, 2006, however, no

amendments were made to the claims." It should be noted the Action of April 13, 2006 was a Non-Final Rejection.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

6,282,104 KERN 8-2001

5,521,487 LIU 5-1996

Machmoum et al. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter*, 09-19-1995, Pages 1-6

### **(9) Grounds of Rejection**

Claims 1-5, 7-8 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487)

With respect to claims 1, 13 and 19-20 Kern teaches a DC mitigation circuit (column 3 lines 13-36), comprising: a control circuit (item 40) for evaluating (Kern uses a feedback control loop item 30 and items 32 and 34 to evaluate the DC and harmonics in a transmission line) an amount of DC current resulting from the DC in a transmission line (such as leads 42 and 50). While Kern is silent on the use of switches for providing current into the windings of a transformer, Kern does teach the use of a current control signal by DC offset adjust device item 24 on lead 62 to adjust the DC and harmonics entering the windings of a transformer. Liu provides a teaching of using switches (Fig. 1 item 10 and 11 solid state switches comprising a IGBT or thyristor switch) for providing a current into a winding of a transformer, in order to mitigate or dampen harmonic frequencies in the transmission line, wherein the windings of the transformer of Liu generates a magnetic flux that offsets harmonic current in transmission lines (column 3 line 57 – column 4 line 24). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kern to use a connection to a transformer by

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switches of Liu to because Kern states power converters are known in the art but does not disclose what elements comprise a power converter. Liu teaches a power converter comprised of switches that perform a similar function, harmonic cancellation. Therefore one of ordinary skill having read Kern's disclosure would have selected a known power converter such as the one disclosed in Liu to achieve the harmonic cancellation function.

With respect to claims 2, 12 and 17 Kern as modified by Liu teaches the control circuit evaluates an amount of harmonic and non-harmonic AC current resulting from the DC in the transmission line see harmonic analyzer item 38 and current transformers items 32 and 34 of Kern for example which determines whether a harmonic AC current exists or if a DC current is present and Kern as modified by Liu teach the mitigation of such harmonic and DC current would be through offset flux generated in the windings of the transformer .

With respect to claim 3 Liu teaches DC mitigation circuit is connected to an output filter (Fig. 1 item 9) for filtering an output of said switches.

With respect to claim 4 Liu teaches the control circuit is connected to a primary winding of said transformer (Fig. 1 column 2 lines 1-20).

With respect to claim 5 Liu teaches control circuit is connected to a secondary winding of said transformer (Fig. 1 column 2 lines 1-20).

With respect to claim 7 Liu teaches the switches are connected to a tertiary winding (Fig. 1 item 5) of said transformer.

With respect to claim 8 Liu teaches the DC mitigation circuit of claim 1, further comprising a capacitor (Fig. 1 item U1) for powering said switches.

With respect to claim 14 Liu teaches the current supplied to said transformer winding is provided by an internal power supply (Fig.1 item U2).

With respect to claim 15 Liu teaches the switches are used to control said current that is outputted from said power supply to said transformer winding (Fig. 1 see column 3 lines 20-35).

With respect to claim 16 Liu teaches the step of filtering said current output from said switches (Fig. 1 item 9).

With respect to claim 18 Liu teaches the switches may be integrated IGBT type switches.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487) as applied to claim 1 above, and further in view of Oliver (U.S. Pat. No. 5,179,489)

With respect to claim 6 Kern as modified by Liu teaches the control circuit is connected to said transformer but does not teach the connection to the core of the transformer. Oliver teaches connecting a filter to the core of a transformer. It would have been obvious to one of ordinary skill in the art at the time of the invention to move Liu's connection point to the core to increase the efficiency of the of the transformer.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kern (U.S. Pat. No. 6,282,104) in view of Liu (U.S. Pat. No. 5,521,487) as applied to

claim 1 above, and further in view of *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter*.

With respect to claim 9 Liu teaches the use of the capacitors associated with the switches but does not teach the use of the diodes used in conjunction with the switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches the use of switches further comprise diodes connected across said switches so as to charge said capacitor during a frequency cycle. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to use a diodes connected across the switches to discharge the capacitor and supply the transformer and filter with power.

With respect to claim 10 Liu teaches the device of claim 1 and the use of a source connected across a the switches in Fig. 1 but does not teach the use of the teaches switches being MOSFETs and diodes carry current in an opposite direction from said MOSFET switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches switches being MOSFETs and diodes connected across a source and drain of said MOSFET switches so as to carry current in an opposite direction from said MOSFET switches (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to use a diodes connected across the switches connected to Liu source in control the source.

With respect to claim 11 Liu teaches said capacitor discharges during said frequency cycle so as to power said MOSFET switches. *A Practical Approach to Harmonic Current Compensation by a Single-Phase Active Filter* in Fig. 1 teaches



diodes which are configured to discharge the capacitor during a frequency cycle. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Liu to control the discharge of the capacitors.

### **(10) Response to Argument**

Applicant first argues (page 12 of the Brief) Kern does not address DC flux in a transformer. In response it should first be noted "DC flux in a transformer" is not a claimed limitation. Further the transformer of Kern (item 26) magnetically couples the input windings (46) and the output windings (48). When a voltage is applied to the input winding it creates a time-varying magnetic flux in the transformer, which in turn induces a voltage in the output windings. Kern provides a harmonic analyzer (38) which processes a combined signal from both sides of the transformer via a signal combiner to determine the presences of a second order harmonics in the current passing through the voltage transformer (col. 9 lines 30-35). Kern analyzes the current passing through the transformer to eliminate second order harmonics and thereby mitigating DC, therefore as pointed out the current passing through the transformer is analyzed and the flux within the magnetic field of the transformer is realized by analyzing the current passing there though.

Applicant secondly argues Kern in view of Liu fail to teach a control circuit for evaluating DC current on a transmission line. Specifically pointing out neither of the cited patents is directed towards transmission lines. As pointed out in the previous

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action the term transmission line is not given a special definition and is treated with an ordinary meaning. Kern for example teaches the use of the disclosed system in a variety of power distribution systems (col. 3 line 15). Also as seen in for example figure 1 the control system is disposed in-line between a power source (item 12) and the utility and also to loads (16). The conduction path of power from a power source to a load and/or utility is seen by the examiner to constitute a transmission line.

Applicant then argues Kern evaluates and mitigates one cause of DC current on a transmission line, it [Kern] does not evaluate and mitigate the DC current on the transmission line (page 13 brief). In response the claim limitation do not require the evaluation and mitigation of all causes, the mitigation of one cause, such as that of second order harmonic frequencies, causing the DC current on a transmission line is sufficient to render obvious Applicant's claimed limitation of mitigating DC on a transmission line and as noted above Kern's system does constitute a transmission line.

Applicant also argues neither reference teaches applying a current to winding to offset a flux created by DC current and neither reference teaches or discloses how to correct DC current originating in the transmission line. In response it is noted Kern teaches the input winding of the voltage transformer receives a signal, which is adjusted via the DC offset adjust signal via the power converter. Kern describes this as a feedback control loop, which operates the converter to account for changes in the system (col. 8 lines 54-58) so that the power on the line may be clean and reliable signal. Kern is directed to mitigating or reducing certain harmonic frequencies, which are causes of DC in transmission line.

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Applicant lastly argues the active filter disclosed in Liu would have absolutely zero impact on DC current in the primary winding. Thus one skilled in the art would not utilize the active filter of Liu to fulfill the DC offset needs of Kern. Liu is not provided to teach the use of an active filter. Kern teaches a power converter, which receives a DC offset, adjust signal, Kern does detail the circuitry and components contained within the power converter. Liu is provided to support that one of ordinary skill in the art would recognize the use of switches as a known means to inject the DC offset signal (Kern item 24) in the transmission line. The use of switches in the power converter would enable the control system to output AC power to the loads. As stated in the previous action the use of switches such as those disclosed in Liu in the power converter of Kern would have been obvious to one of ordinary skill in the art as a means of carrying out the function of the power converter block (item 22) disclosed in Kern.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

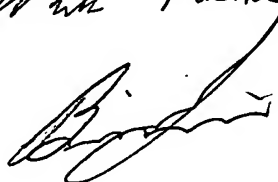
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

 Michael Rutland-Wallis

Conferees:

Brian Sircus



Darren Schuberg

